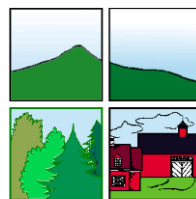


CARSHARING: AN ALTERNATIVE TO PRIVATE VEHICLE OWNERSHIP

Background, Case Studies, and Recommended
Next Steps for the Monadnock Region



SWRPC



Prepared for the Monadnock Alliance for Sustainable Transportation (MAST) by Southwest
Region Planning Commission (SWRPC)

Acknowledgements

This report was prepared by the Southwest Region Planning Commission with assistance from Lisa Donnelly, Keene State College intern. The report was initiated by the Monadnock Alliance for Sustainable Transportation (MAST). The MAST Steering Committee provided valuable input they throughout the development of this report. In addition, the following individuals contributed to this report through telephone and email interviews:

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- Emily Fleck, Executive Director, Carsharing Association
- Bruce Gardave, Executive Director, Kootenay Carshare Cooperative
- Cary Gaunt, Director of Campus Sustainability, Keene State College
- Emma Kerr, Sustainability Coordinator, Smith College
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The preparation of this document has been supported by the Federal Highway Administration and Federal Transit Administration, U.S. Department of Transportation, under the State Planning and Research Program, Section of Title 23, U.S. Code. The contents of this report do not necessarily reflect the official views or policy of the U.S. Department of Transportation.

About the Monadnock Alliance for Sustainable Transportation

MAST is an alliance of individuals and organizations working to implement sustainable transportation solutions for the Monadnock Region. MAST recognizes the broad impacts that our transportation system has on us as individuals and as communities - everything from access to employment and services to cost of living to our health and beyond.

Given transportation's prominent role in our daily lives, MAST believes a diverse coalition of government, businesses, non-profit and other groups are essential for addressing these transportation challenges. Accordingly, the purpose of MAST is to serve as a forum and structural framework to:

- Build consensus on transportation needs and solutions;
- Foster the development of local and regional partnerships on transportation initiatives;
- Provide information about sustainable transportation initiatives;
- Help individuals and groups identify support for sustainable transportation options;
- Connect stakeholders with funding resources and technical assistance services; and,
- Advocate and educate about sustainable transportation needs and benefits.

For more information about MAST, please visit www.MASTNH.org.

Purpose and Introduction

The purpose of this report is to provide information that will help MAST better understand the feasibility of introducing a carsharing program in Keene, NH and the Monadnock Region. The first section of this report contains background information on carsharing, including a comparison to other mobility options, an overview of who uses carsharing, and some of the benefits of and challenges to carsharing. The middle section includes three case studies that represent a variety of organizational models for carsharing. These case studies take a closer look at how different approaches to carsharing have worked in communities that share some similarities with Keene and the surrounding region. The report ends with recommended next steps for preparing a carsharing readiness assessment and project ideas for Keene and the Monadnock Region.

Background on Carsharing

Carsharing is a transportation option that offers the benefits of having access to a car without the cost or obligations associated with private ownership. The most common carsharing operational model is a usage-based service that gives members access to a dispersed network of shared vehicles throughout a campus, community, or region at unattended, self-serve locations. Cars that are not within easy walking distance are often accessible by public transportation. Membership in a carshare organization generally involves a sign-up fee in addition to a pre-qualification process that requires a valid driver's license and a clean driving record. Many carshare operators also have age restrictions, with occasional allowances for exceptions based on location or individual driving history. Once membership is established, vehicles are reserved online, through use of an app, or with a phone system. Members are given a personal key fob, card, or code to access the vehicles. The vehicles can then be used for a period of time which can range from 15 minutes to several days, and members are charged a monthly fee plus an hourly or mileage based rate. Insurance, fuel, maintenance, parking and sometimes roadside assistance are typically included. Most carshares offer a variety of vehicles including sedans, trucks, and vans to meet the diverse needs of their members. Once a member is finished with a vehicle, it is then returned to its designated parking spot so that it will be available for the next user.

Carsharing is often confused with other mobility options such as traditional car rentals and ridesharing, but each has a distinct list of benefits and challenges as shown in Figure 1. Rather than competing with each other, each mobility option fills a niche in addressing the transportation needs of the community.

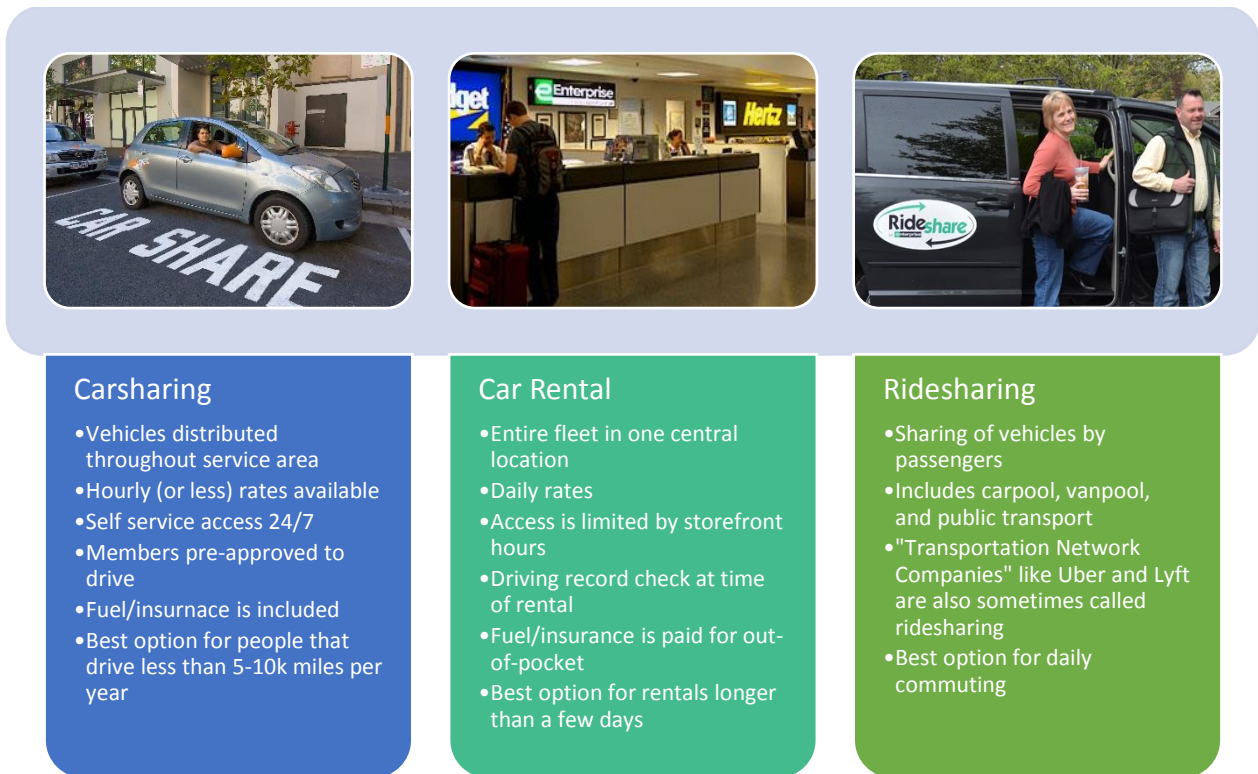


Figure 1. Comparison of carsharing, car rentals, and ridesharing.

There are three major organizational models of carsharing, including business to consumer (B2C), not for profit or co-op (NFP) and peer to peer (P2P).

Business to Consumer (B2C) Model:

B2C carshares own and maintain their own fleet of cars, which are shared by members. Examples include ZipCar and Enterprise Carshare. Companies that use this model often form partnerships with car manufacturers as a means of establishing brand loyalty with members. B2C is very successful in large cities and on university and college campuses. It is an attractive option in many situations because the carshare operator covers all of the startup costs and manages the setup process.

Not-for-profit/Cooperative (NFP) Model:

The day-to-day operation of a NFP carsharing model is similar to the B2C model, however, the focus of NFP carshares is on the social and environmental impact of carsharing over making a profit. NFP carshares are created and operated by a local organization or community. Examples include the Kootenay Carshare Cooperative, CarShare Vermont, and Ithaca Carshare.

Peer to Peer (P2P) Model:

P2P carsharing utilizes a website or app to connect members with privately owned vehicles. Companies such as Turo and Getaround allow owners to rent out their personal vehicles at an hourly or daily rate. P2P can be useful in areas where the population density is too low to support a B2C or NFP model, because the cars associated with B2C and NFP models and the cost of acquiring and maintaining them is replaced by cars that are already owned and maintained privately (Veichnicki, Khuperkar, Dovey & Eggars, 2015).

Who Uses Carsharing

According to a Deloitte survey of 23,000 consumers in 19 countries, 50% of those surveyed said that personal cars are not their preferred method of transportation (Veichnicki et al., 2015). This statistic is consistent with transportation trends in North America, where studies have shown that carshare memberships grew by 34% by 2014, from less than 1 million members to more than 1.3 million, with an increase of more than 2,300 vehicles (Shaheen & Cohen, 2016). Members tend to be located in or near urban neighborhoods with medium to high population densities or college campuses. The majority of them are young adults age 25 to 45, single or childless couples that rent their homes, with high levels of education and a middle to upper class income. They are users of other modes of transportation such as trains, busses, and bicycles. Carsharing tends to succeed in areas where public transportation is available, because it acts as a compliment to other modes rather than as competition. It allows more flexibility for people who already use or prefer alternative methods of transportation and only occasionally need the use of a vehicle. Businesses also benefit from carsharing by augmenting or replacing their own fleet with carshare vehicles.

Benefits

Stress reduction is one of the principal benefits associated with carsharing. A significant amount of time and money is saved on repairs, maintenance, insurance, and cleaning of a shared vehicle compared to private ownership. Having access to many vehicles also means that if one breaks down, it doesn't stop you from completing your trip. In addition to the benefits associated with reducing financial stress, carsharing also supports physical health. Private car use is linked to physical inactivity, whereas carsharing often involves active transportation like walking or biking to get to and from the vehicles. Studies show that members are also more likely to choose to use active transportation for short trips where a car isn't needed (Matte, 2015).

Because membership fees and hourly/mileage fees are generally low, and because costs like purchase cost, insurance, fuel, and maintenance are covered by the carshare's operator, carsharing can also bring mobility to individuals and families that may not be able to afford private car ownership. The cost savings are significant for members that drive between 5,000 and 10,000 miles or less per year (*Bringing Car-Sharing*). Access to a carshare reduces automobile dependence, and allows individuals and families to choose to live without a vehicle, or to go without a second car. Businesses that depend on company cars can also benefit from carsharing, as a potentially lower cost alternative to owning and maintaining their own fleet.

In addition to the cost savings, carsharing has been shown to decrease our collective dependence on fossil fuels. Even as it increases the vehicle miles traveled (VMT) of individuals and families who couldn't drive before, it reduces VMT overall, since it also enables people who previously owned private vehicles to drive less. Studies show that since access to carsharing services reduces private car ownership, every carsharing vehicle replaces approximately 9 to 13 cars on the road in urban areas, resulting in congestion and parking relief (Martin & Shaheen, 2011). Fewer cars on the road, coupled with the fact that the majority of carshare vehicles are hybrid or fuel efficient, means an overall decrease in emissions levels.

The social and economic benefits of carsharing are also considerable. It attracts and retains a young and educated workforce by offering more transportation options, which makes the community more desirable (Veichnicki et al., 2015). Carsharing encourages active transportation, which improves community health and gets people out of their cars and interacting with neighbors. It makes transportation more equitable, helping people get where they need to go regardless of income. Partnerships between carsharing services and retailers can also promote economic growth. For example, CarShare Vermont members have access to discounts at a long list of local shops and restaurants.

Challenges

There are many challenges associated with every carsharing organizational model. Late returns, vehicles parked in the wrong place, minor and major damage to the vehicles, dead batteries, etc. are problems that every carshare has to deal with. Most operators have staff on call for emergencies, minor repairs, and to redirect members to the next best option if the car they reserved is unavailable.

Startup costs are considerable for NFP carshares, and they often depend heavily on fundraising and grants from government and private foundations. Insurance is the major cost for operators, though there are occasionally non-profit insurance discounts available. The cost of acquiring, maintaining, repairing, and supplying fuel for a fleet is significant. Access to parking is another potential obstacle, since inability to secure parking can prevent a service from operating (Veichnicki et al., 2015). There are also day to day operations to manage, reservation technology to set up and maintain, staff to hire, etc. Establishing a relationship and securing cooperation from the local transit authority is also hugely important. Financial stability depends on high utilization rates, with a minimum goal of 40% or 9 hours per day not likely to be met in the early years. That rate of usage requires pods of 2 to 3 vehicles to have a member proximity of 45 to 60 within walking distance, though that number is decreased slightly if the pods are located near public transportation hubs (City Carshare, n.d.). In order to meet usage goals, extensive market research as well as marketing and outreach is vital.

Bringing a B2C carshare to a community or college campus is less complicated, since they have an established business model and the ability to provide their own fleet, but there are still challenges. Companies like ZipCar require projected usage rates to be met before they will enter into a contract, and if the revenue falls short of the cost of the cars, the host pays the difference. There are also parking issues that need to be negotiated and approved by both the carshare operator and the municipality or college.

Case Studies

Three different carshares were chosen to help provide insight into the viability of carsharing in Keene, NH and the Monadnock Region. ZipCar at Smith College in Northampton, Massachusetts has a similar demographic profile to Keene, and represents the potential of bringing a B2C carshare to the area. CarShare Vermont is included because of their commitment to bringing social and environmental change to their community, which mirrors the cooperative spirit of the local community in Keene. The Kootenay Carshare Cooperative in B.C., Canada is included to demonstrate how carsharing can succeed in a rural setting, which may provide insight on how to bring mobility to the more rural areas throughout the Monadnock Region.

Case Study 1: Northampton, MA & Smith College

Carsharing Model: Business to Consumer **Year Started:** 2006

Community Snapshot: **Current Status:** ongoing/successful

Location	Population	Population Density	College Population	% of workers that walk to work	% of workers that bike to work
Northampton, MA	28,540	829 people per square mile	Smith College: 2,563	11.9	3.1
Keene, NH	23,265	617 people per square mile	Keene State College: 4,383	11.6	1.0

About Smith College

Smith College is a women's liberal arts college in Northampton, Massachusetts. It is part of the Five College Consortium that includes Amherst College, Hampshire College, Mount Holyoke College, and UMass Amherst. While Zipcars can be found on every campus in the Consortium, the local Zipcar program serves Smith's campus population of just under 3,000 students, in addition to faculty, staff, and the approximately 29,000 people of the City of Northampton.

Starting Small

In 2006, as one of several traffic mitigation solutions adopted on campus, Smith College partnered with Zipcar to launch its carsharing service on campus with two cars. Zipcar paid for the cars, which cost approximately \$18,000 each. The College agreed to make up the difference if the usage rate generated less capital than total cost of the cars by the end of the academic year. The program was so successful that another two cars were added to the fleet in 2008, just two years after the program was launched. These four cars are available for students (18+ only), faculty, and staff to use.

Expanding to the Larger Community

In 2014, the City of Northampton agreed to allow Zipcar to lease municipal parking spots in the downtown area, opening up the carsharing program to the larger community. In exchange for providing more cars, Zipcar initially wanted the City of Northampton to dedicate up to six parking spaces for ZipCar vehicles. Since doing so would result in a loss of parking revenue for the City, a deal was negotiated and Zipcar agreed to lease two parking spaces from the City. Anyone over the age of 21 years can use these cars. In 2015, based on usage data, Zipcar recommended bringing the number of cars up to 7 for the 2015-2016 school year. According to the Director of Planning and Sustainability for the City of Northampton, the City would like to add two additional cars off campus once it reaches the user rate required by Zipcar (Serreze, 2014).

How it Works

Zipcar allows members to rent a car for as little as one hour up to as long as a week. Cars are picked up and returned to the same location, however members can take the cars anywhere - including outside of the municipality - while the cars are in use. Membership involves signing up on the website or by using the app. Applicants must be at least 21 years of age, or 18 to 20 years if affiliated with a college or university. A Zipcar membership costs a \$25 application fee, and \$7 per month. Driving costs are \$7.50 per hour or \$69 for a full day. The campus community is provided a university discount of \$10 off the application fee and \$1 off the hourly rate thanks to a subsidy from the Ford Motor Company. Fuel, insurance, and roadside assistance are included. Cars are reserved online and are unlocked using the app or a keycard. Zipcar members are charged by the hour or by the day, and the cars are returned to their reserved parking spots after use.

Impacts

- Traffic mitigation and congestion relief – Studies show that one shared vehicle replaces 9-13 cars on the road.
- Parking relief - Reduced demand for student parking as fewer students are opting to bring their own cars to campus, which has helped save the College money by reducing the number of parking spaces required on campus.
- Reduced emissions – All of the cars in the fleet are “SmartWay Certified” by the U.S. Environmental Protection Agency (EPA). According to the EPA website, the cars are rated “for greenhouse gas and smog-forming emissions on scales of 1-10. To earn the SmartWay designation, a vehicle must receive a combined score from both scales that is much better than the average vehicle.” Studies also show that people who participate in a carshare program choose to walk or take other alternative forms of transportation, which contributes to an overall reduction in emissions.
- Parking off-campus results in revenue for the City – Zipcar leases two spaces for its cars that are located near the City Hall for approximately \$1,200 per year.

Challenges

Keeping the Zipcars clear of snow has proved to be a challenge which the City hopes to improve by working with Zipcar and possibly moving the cars to a parking garage. The City would also like to eventually expand the program, but usage thresholds need to be met in order to do so.

Case Study 2: CarShare Vermont

Carsharing Model: Not for Profit

Year Started: 2008

Community Snapshot:

Current Status: ongoing/successful

Location	Population	Population Density	College Population	% of workers that walk to work	% of workers that bike to work
Burlington, VT	42,417	3,997 people per square mile	University of Vermont: 5,500	20.3	5
Montpelier, VT	7,855	784 people per square mile	N/A	16.4	1.8
Winooski, VT	7,267	5,191 people per square mile	N/A	7.2	1.6
Keene, NH	23,265	617 people per square mile	Keene State College: 4,383	11.6	1.0

Turning an Idea into Reality

In 2002, the City Council of Burlington passed a resolution to explore carsharing. A group of people made up of representatives from the City of Burlington, local businesses, and non-profit organizations met occasionally over the next four years to collect and share information about how to attract an existing carshare operator to the area, but never got past the “talking stage”. It was during that time that they reached out to Annie Bourdon of City Carshare in San Francisco, CA. When Annie left City Carshare and moved to Burlington in 2006, she reconnected with the group and volunteered to take a lead role in organizing a nonprofit carsharing operation in Burlington. In 2008, after four years of information gathering and two years of planning, fundraising, and organizing, CarShare Vermont was officially launched in Burlington with 8 vehicles (A. Bourdon, personal communication, July 27, 2016). Today, CarShare Vermont is a roundtrip carsharing service that offers its 1,100 members access to 19 vehicles in 3 cities. The majority of the vehicles are located in Burlington, with additional pods in Winooski and Montpelier.

Mission/Why non-profit

CarShare Vermont’s mission is to “provide an affordable, convenient, and reliable alternative to private car ownership that enhances the environmental, economic, and social wellbeing of our region and planet.” The nonprofit co-op model supports this mission by helping to meet the community’s transportation needs while also reducing the number of privately owned vehicles. The operation of CarShare Vermont’s round-trip model is similar to most of the business to consumer models used by large for-profit companies like Zipcar, but by focusing on social change instead of profit, CarShare Vermont contributes to the stability and economic health of the local community by keeping their services affordable. Start-up funding came from a combination of foundation grants, donations and the Chittenden County Regional Planning Commission. Currently 80% self-sufficient through membership

dues and driving revenue, with the remainder still paid for with grants, CarShare Vermont hopes to break even by 2018, ten years after launch.

How it Works

Becoming a member involves a \$30 application fee, and the eligibility requirements vary depending on age. All members are required to have had their current license for at least two years, as well as a clean driving record. Drivers between the ages of 18 and 21 are also asked to sign and submit a “Young Driver Membership Agreement” with a cosigner. There are two different plans available once membership is established. The “Share-a-Little” plan costs \$5 per month and \$8 per hour, and the “Share-a-Lot” plan costs \$15 per month and \$6 per hour. There are also full day rates for 24 hour rentals. Subsidized memberships are also available to qualifying members on a case by case basis. Membership includes gas, insurance, maintenance, road side assistance, and parking. Several cars are outfitted with racks to carry bicycles or other sporting equipment. Some of the cars are also pet-friendly. A variety of vehicle types can be rented, including vans and pickup trucks. Discounts and special promotions are available to members at a long list of local businesses.

Community Impact

- According to surveys, 50% of members report feeling more connected to the community since joining CarShare Vermont.
- Industry and local research indicates improved air quality and traffic relief because of reduced car use.
- Members spend more time out of their cars and engaging with neighbors.
- Transportation system is more equitable, bringing stability and economic health to the community.
- Carsharing encourages biking and walking for shorter trips, making the community healthier.
- Membership includes discounts at many local retailers and restaurants.
- CarShare Vermont reports that their members who drive 100 miles over 10 hours per month spend only \$1,200 per year, compared to much higher yearly costs associated with private vehicle ownership.

Challenges and Lessons Learned

Before the program was officially launched in 2008, demand had to be assessed through detailed market research. Understanding members and potential members through surveys and focus groups was and continues to be critical information to have for marketing and outreach efforts. An extensive business plan was developed that addressed the following:

- Fundraising;
- Incorporating;
- Applying for tax-exempt status;
- Market research (with the help of a consultant);
- Board development;
- Branding and marketing;
- Acquiring technology & procuring vehicles;

- Lining up insurance;
- Hiring staff;
- Creating all documentation and member materials;
- Making arrangements to provide CarShare Vermont with designated parking and local authority to enforce the space; and
- Setting up all day-to-day systems and procedures.

According to CarShare Vermont, significant cultural change was necessary to make carsharing successful in Burlington. Change on that scale takes time and effort, and as a result they spent a great deal of time doing grassroots outreach, including hosting house parties, conducting door to door canvassing, compiling regular email newsletters, developing and distributing print materials, and reaching out to the local media.

Case Study 3: Kootenay Carshare Cooperative, Nelson, British Columbia, Canada

Carsharing Model: Rural Co-op

Year Started: 2001

Community Snapshot:

Current Status: ongoing/varying success

Location	Population	Number of Vehicles	Usage Requirement Met?
Fernie	4,308	1	No
Kaslo	998	2	Yes
Kimberley	6,746	2	No
Nelson	10,802	10	Yes
Revelstoke	7,192	3	Yes
Rossland	3,575	2	No

About Kootenay Carshare Cooperative

Founded in 2001 as the Nelson Carshare Co-op, the Kootenay Carshare Cooperative (KCC) was started by a group of friends that decided they no longer needed their own vehicles. The co-op is member owned, giving its members control of the scope and direction that the co-op takes. In 2006, the organization expanded to the neighboring towns of Kaslo and Revelstoke, and in 2009 two additional branches were added in the towns of Fernie and Kimberley. The Rossland branch was added in 2014, as part of the city of Rossland’s sustainability plan. The Co-op currently has 20 vehicles across six locations in the Kootenay region. KCC is modeled after MODO, a member-owned carshare cooperative based out of Vancouver. As an environmental organization, the co-op’s primary goal is to reduce greenhouse gas emissions and work towards becoming “carbon neutral” (i.e. zero net greenhouse gas emissions). The environmental impact of KCC’s fleet is significant, with an estimated 5 vehicles taken off rural roads for every KCC vehicle, and a reduction of 157.9 tons of greenhouse gases per year. To further KCC’s environmental goals, a 0.002 cent per KM charge is put into a reserve account to purchase alternative fuel vehicles in the future.

What Makes KCC Unique?

KCC represents six rural towns within the mountainous Kootenay region. Unlike urban carshare models, where usage rates are dependent on high population densities, the success of rural carshare models depends on other factors. Urban carshares often serve as a compliment to transportation infrastructure, expanding alternative methods of transportation and increasing the mobility of its users. In a rural setting,

carsharing fills a void where access to public transportation is limited or not available. Successful town branches also tend to be located in areas with a lower average income, which makes the cost savings of carsharing significant for individuals and families that can't afford--or choose against--private car ownership. KCC also found that town branches were more likely to gain new members and retain current members when at least two vehicles were made available, with a truck as one of the vehicles. Rural carshare models also differ from urban models in the way that they grow. Since the population is smaller, the growth of a rural carshare involves opening new town branches in other locations, rather than expanding existing service in a central location. Successful growth depends heavily on having a local "hero" on the ground to promote the carshare, as well as thorough market research, a diverse community of potential users, and access to a variety of vehicle types.

Building Social Capital

Developing mutual trust and a sense of community is paramount to the success of a rural carshare. KCC members have access to every other member's contact information, allowing them to work out scheduling conflicts amongst themselves. Social events allow members to get to know one another and help make communication easier and more comfortable. Peer group communication is key to making sure every member's needs are met.

How it Works

In order to become a member of KCC, individuals need to have a valid driver's license, three years of driving history, and a good credit score. Potential members also need to meet KCC's driving standards, and need to provide proof of having no at-fault accidents and fewer than 3 minor infractions within the last three years on their driving record. If all of the requirements are met, a member share can be bought for \$500, or \$250 for an "associate member" share for family members in the same household. There is a payment plan as well as a low-income plan available on a case-by-case basis. Once membership is established, vehicles are booked using an online calendar for time slots as brief as 30 minutes up to as long as 29 days. Usage costs include a low monthly and hourly/mileage rate and members are billed monthly. Keys are located in lock boxes that are located on the car window or on the house where the car is parked, to which members are given a code to open. Membership includes insurance, fuel, maintenance, and repairs. It does not include roadside assistance, and members are encouraged to purchase their own.

Challenges

- Lack of outreach caused low usage of KCC's low-income plan, which offers a no interest loan that covers the \$500 membership share to people on income assistance. It was often confused with the payment plan option, which involves a \$200 down payment and \$100 monthly payments that are still too expensive for many low-income households (Matte, 2015).
- The criterion for starting a branch is not consistent, which puts a financial strain on KCC as branches would start without the necessary extensive market research or diverse founding membership needed to meet usage requirements.
- In order to reach a broader audience, the language promoting the benefits of carsharing had to change to include the financial and social benefits as opposed to being limited to the common understanding of carshares as an environmentally friendly transportation alternative.

- KCC does not have an advertising budget, and depends on word of mouth and the enthusiasm of its founding members to attract new members.

Potential Next Steps and Project Ideas

Since Keene shares characteristics with other areas where carsharing has been successful, and considering the success of other cooperative businesses and organizations in the area, an argument could be made that carsharing could potentially do very well in Keene and the Monadnock Region. Understanding the needs of the community is critical. According to the Executive Director of the Kootenay Carshare Cooperative, carsharing survives with users and not supporters. In other words, it is not enough for a community to support the philosophy behind carsharing, they need to actually use the cars.

With that in mind, the next step should be to plan and conduct specific market research to determine whether or not carsharing would be viable and what model would be the best fit for the area. Detailed analysis should be conducted, including public interest surveys, in-depth research into local business partnership possibilities, GIS analysis using local demographic and transportation data, and research on potential funding options. As indicated by the examples included in the case studies portion of this report, forming a specific committee to organize the effort and to conduct the necessary research, as well as identifying an individual willing to act as a local hero or carsharing champion can make all the difference in the success or failure of such an undertaking.

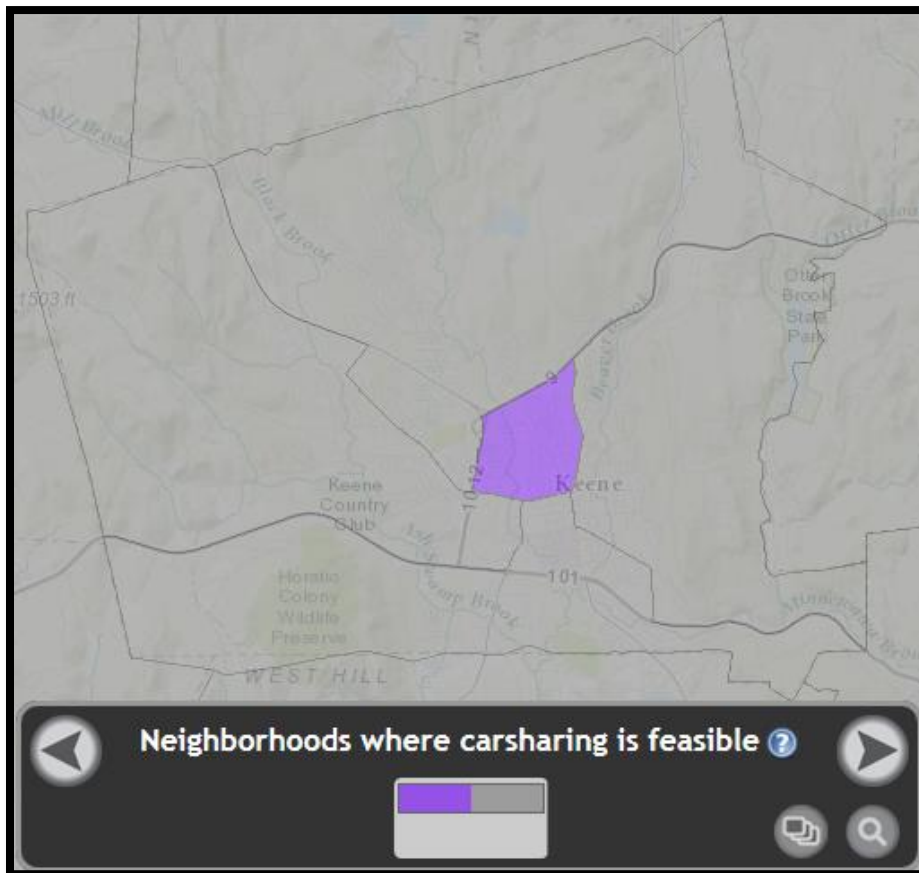


Figure 2. According to the Smart Mobility Trends Interactive Map on the dupress.com website, downtown Keene would appear to be a potential candidate for carsharing in part because of the centrally located Keene State College (KSC) campus.

According to the Smart Mobility Trends Interactive Map on the dupress.com website, downtown Keene would appear to be a potential candidate for carsharing in part because of the centrally located Keene State College (KSC) campus (Figure 2). In the past, the Sustainability Office at KSC identified carsharing as a potential short term solution to provide more mobility to students as well as parking relief on campus. The Director of Campus Sustainability at KSC says that the College is considering including carsharing in the updated version of the Climate Action Plan that is scheduled to be written during the 2016/2017 school year. In order to gauge student interest, surveys should be conducted at KSC and other colleges and universities in the region. ZipCar's website also conveniently provides a student petition and pre-written letter for students that want to see carsharing on their campus.

The Monadnock Sustainability Network (MSN) includes carsharing in the Monadnock Sustainability Action Plan. MSN's founder and President expressed an interest in this report, and offered to include some of the findings on the MSN website. Existing local public transportation infrastructure also supports the addition of carsharing to the area, with bus routes that extend outside of the downtown area into the western part of Keene. Keene's electric charging stations are located within the projected carsharing service area, opening the door for discussion on the potential for including electric or hybrid vehicles in the fleet. The Carsharing Association (CSA) suggested that local dealerships, banks, insurance companies, and technology providers in the community are worth speaking to about potential partnerships and opportunities to collaborate on the project.

Annotated Bibliography

City Carshare. (n.d.). *Bringing Car-Sharing to Your Community*. Retrieved from http://www.communauto.com/images/03.coupures_de_presse/CCS_BCtYC_Long.pdf

This is City Carshare's guide to introducing carsharing to your community. The publication defines carsharing and other related terms, presents relevant statistics, and offers practical advice on how to approach starting a carshare.

Le Vine, S., Zolfaghari, A., & Polak, J. (2014, September). *Carsharing: Evolution, Challenges and Opportunities*. Retrieved from https://www.acea.be/uploads/publications/SAG_Report_-_Car_Sharing.pdf

This report goes into detail about how carsharing works, including different operational models, the pre-qualification process, and billing. It also includes information on the growth of carsharing, insurance concerns, parking issues, and the importance of involving a trusted third party. A demographic profile of areas where carsharing has been successful is also given.

Martin, E., & Shaheen, S. (2011). *The Impact of Carsharing on Household Vehicle Ownership*. Retrieved from <http://www.accessmagazine.org/articles/spring-2011/impact-carsharing-household-vehicle-ownership/>

Access Magazine published this online article on how carsharing reduces car ownership and the resulting environmental impact.

Martin, E., & Shaheen, S. (2011, December 01). *Greenhouse Gas Emission Impacts of Carsharing in North America (journal article)*. Retrieved from <http://tsrc.berkeley.edu/ghgmissionimpacts>

One of the most significant benefits of carsharing, the impact on emissions reductions, including the full and observed impact is discussed in this paper. It also details what kind of research was done and the methods used. This is the study that was cited by many of the other works on the subject.

Matte, C. M., (2015, September). *The Social Factors That Influence the Success of Rural Carshare Operations in the Kootenay Region of British Columbia, Canada (Master's Thesis)*. Retrieved from <http://dspace.royalroads.ca/docs/handle/10170/784>

Matte's thesis goes into detail about the differences between rural and urban carshare operations, specifically about the successes and challenges experienced by the Kootenay Carshare Cooperative.

Serreze, M. (2014, September 02). *Northampton mayor welcomes Zipcar to downtown*. Retrieved from http://www.masslive.com/news/index.ssf/2014/09/zipcar_comes_to_downtown_north.html

This article on masslive.com is about ZipCar's move to extend their services outside of Smith College's campus and into the downtown Northampton area.

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The Transportation Sustainability Research Center at UC Berkeley published this report with updated statistics on carsharing market trends.

Stillwater, T., Mokhtarian, P., & Shaheen, S. (2009, December 1). *Carsharing and the Built Environment: Geographic Information System-Based Study of One U.S. Operator*. Retrieved from <http://tsrc.berkeley.edu/carsharingbuiltenvironment>

Using GIS to compare the use of carsharing vehicles to built-environment and demographic factors, this report presents the results of that study. It explores the relationship between other public transportation options and carsharing operations.

Veichnicki, P., Khuperkar, A., Dovey Fishman, T., & Eggars, W. D. (2015, May 18). *Carsharing*. Retrieved from <http://dupress.com/articles/smart-mobility-trends-carsharing-market/>

This online article discusses the potential of carsharing in North America, and includes “5 ways to accelerate carsharing”. It briefly touches on potential cost benefits as well as some of the demographic data that indicates where a carshare might be successful.